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ABSTRACT

This paper describes the subjectivist teaching paradigm, which has been introduced into a mathematics education course at the University of the South Pacific. Subjectivism integrates such aspects of current teaching philosophy as lifelong learning through student empowered, self-directed learning. Subjectivism, which is student centered, emphasizes the individual's subjective learning experience by adding feelings, interest, and motivation to enhance cognitive learning in constructivist classrooms. It involves engrossing socially constructed classroom activities to enculturate students into the skills and values of the content subject. Two humanitarian aims of subjectivism are subject enculturation and student empowerment. Subjectivism achieves these aims using similar enculturation processes in classroom activities that children experience in learning their own sociocultural processes and values. Enculturation processes include peer pressure, social recognition, compliance with authority, shared experience, establishing role identity, in-group bonding, and out-group competition. Hence, classroom activities focused on the subject content become authentic living experiences. This paper illustrates how these social constructivist activities, called surface purposes, are designed using three affect-structuring techniques (emotional anchors, motivators, and cognitive direction). It describes empowering enculturating activities that have been successfully used with education students and school children. (Contains 45 references.) (SM)

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ENCULTURATION AND EMPOWERMENT IN THE SUBJECTIVIST CLASSROOM

Tony Bastick

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Enculturation and Empowerment in the Subjectivist Classroom

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Abstract

This paper introduces the Subjectivist teaching paradigm. Subjectivism is an affect-structured constructivist pedagogy. The paper shows how to design enculturating and empowering content focused activities and gives examples of such activities that have been successfully used with education students and with school children.

The paper describes an alternative teaching paradigm that has been introduced on mathematics education courses in the University of the South Pacific in Fiji. The method, called Subjectivism, integrates many desirable aspects of current teaching philosophy - such as life-long learning through student empowered self-directed learning. Subjectivism, is student centred. It focuses on the subjective learning experience of the individual by adding feelings, interest and motivation to act as multiplying factors to cognitive learning in the constructivist classroom. Subjectivist teaching utilises engrossing socially constructed classroom activities to enculturate students into the skills and values of the content subject. The two humanitarian aims of subjectivism are (i) Subject Enculturation and (ii) Student Empowerment. It achieves these aims using similar enculturation processes in classroom activities that children experience in learning their own socio-cultural processes and values; enculturation processes such as peer pressure, social recognition, compliance with authority, shared experience, establishing role identity, in-group bonding and out-group competition. Hence the classroom activities, which are focused on the subject content, become authentic living experiences. This paper illustrates how these social constructivist activities, called 'surface purposes' are designed using the three affect-structuring techniques of Emotional anchors, Motivators and Cognitive direction. Practical empowering enculturating activities are describe that have been successfully used with education students and with school children.

Constructivism as a cognitivist theory of knowledge

Constructivism is a popular paradigm for teachers across subjects as diverse as university pharmacy courses to elementary science (Beeth, 1996; Damon, 1997; John & Bancroft, 1989; Lin , 1998; Oliver, 1997). The constructivist approach is widely valued because it can formalise understanding, pose problems of emerging relevance to learners, structure learning around "big ideas" or primary concepts, seek and value students' points of view, adapt curriculum to address students' suppositions, and assess student learning in the context of teaching. It promotes current positive pedagogic values such as active engagement, authenticity, collaboration, community, complexity, generativity, multiple perspectives, subject ownership, personal autonomy, personal relevance, pluralism, reflectivity, self-regulation, and transformation (Brooks & Brooks, 1993; Lebow, 1995; Pirie & Kieren, 1994).

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Although constructivism is a popular and valued teaching paradigm, from Piaget through Bruner to von Glasersfeld it is an overwhelmingly cognitivist theory of knowledge (Bruner, 1960, 1966; Cooper, 1993; Drescher, 1991; Garrison, 1993; Glasersfeld, 1996; Greenberg, 1988; London, 1988; Lyddon, 1990; Mareschal & Shultz, 1996; Niaz, 1995; Quartz & Sejnowski, 1996; Reynolds, 1995; Sigel & Cocking, 1977; Spiro, 1991; Stahl, 1995; Steffe, 1990; Wadsworth, 1971). Constructivism emphasises cognitive aspects of learning at the expense of the affective concomitants of social constructivism (Daniels, 1994; Niaz, 1994).

Affective multipliers of learning

This cognitive emphasis ignores the efforts teachers make to build affective multiplying factors into their lessons to enhance students learning. Good teachers know that affective factors, such as building motivation, interest, curiosity and social recognition have the power to transform routine lessons into exhilarating experiences that drive life long learning and a love of the subject (Arnone & Small, 1995; Beebe & Ivy, 1994; Boekaerts, 1988; Bomia, et al, 1997; Brigham, 1991; Simpson, 1987; Sylwester, 1994) For this quality of teaching it is necessary to consider how to use both emotion and cognition together (Carter & Yackel, 1989; Fielding, 1989; London, 1997; Oldfather & Dahl, 1995). As yet there is no rigorous psychological paradigm to show these teachers how to combine affect with constructivism and explain to them why it works. Unfortunately, constructivism has had no pedagogy to guide teachers in using affective adjuncts to cognitive learning in their classrooms (Huinker & Madison, 1995; Hwang, 1996; Roblyer, 1996; Savery & Duffy, 1995; Willis, 1995).

Subjectivism

Recently, Subjectivism has been proposed (Bastick, 1999) as a paradigm that integrates constructivism and affect. Subjectivism explains how teachers can use affect to enhance constructivist learning and to design authentic affective/cognitive learning experiences. It is a psychology of the subjective experience of learning. It adds affective experiences to constructive theory and explains how this acts to enhance learning. The theory also suggests techniques that teachers can use to design Subjective learning experiences for their students in their own classrooms. Subjectivism recognises two overarching aims that teachers have when they use affect multipliers to enhance learning (i) enculturation into the skills, understanding and values of their subject and (ii) empowerment of their students to become self-directed life-long learners. Empowerment and Enculturation go hand-in-hand and are the aims of Subjectivism. Empowerment by Enculturation, and Enculturation by Empowerment, are the twin humanistic intents of the Subjectivist teacher.

These two aims of Subjectivism are achieved through classroom activities called 'surface purposes'. These can be simple rote-learning games or complex need driven social communication assignments. What they all have in common is that surface purpose activities encourage students to disassociate from the 'pedagogic purpose' of the teacher by focussing their awareness on the surface purpose of the activity. What the teacher's pedagogic purposes all have in common is that students should gain some skills, understandings or subject values that are designated by the subject syllabus. Each surface purpose is designed to be such an engrossing experience that the students learn these aspects of the syllabus at the limit of their abilities. The quality of content learning is assessed traditionally by appropriate criterion standards using tests, exams or various performance assignments. The quality of the Subjectivist learning/teaching experience is assessed by asking what students liked or disliked about the activities. Subjectivist teaching and learning are a success when the students only report liking or disliking the surface purposes. The activities should

have enabled the students to dissociate from the teacher's pedagogic purposes so that classroom management, content structuring and all the traditional lesson design features are not mentioned because they were so peripheral to the students' activity focus.

Enculturation and empowerment: the two aims of Subjectivism

The enculturation methods that are used in the design of surface purposes are the same naturalistic enculturation processes by which the students gain the skills, understandings, and values of their out-of-school socio-subcultures. Examples of enculturation processes used are peer pressure, social recognition, compliance with authority, shared experience, establishing role identity, in-group bonding, and out-group competition. Students experience content learning through the same enculturation processes by which they experience Enculturation into their families, peer groups, religious sects, community fellowships and institutional associations. The common subjective experience of these processes ensures that, for each student, content learning is an 'authentic' learning experience.

Empowerment aims for students to come to know what content and process talents they have in the subject area. Empowerment is realised by students being increasingly able to identify areas that will interest them and ways in which they personally can most effectively learn in those areas; that is, students increasingly become self-directed learners. To develop empowerment the subjectivist teacher must induct students into many perspectives of a content area, and ways of understanding it, so that the students have sufficient experiences on which to soundly base their growing empowerment.

Design of surface purpose activities

In practice, the subjectivist teacher empowers students by designing activities that will result in success. However, the hand of the teacher is so well hidden, that the students take complete credit for their success and so feel empowered. Three techniques that are used to accomplish empowerment are: (i) affect-structuring (ii) covert directives and (iii) self-cuing coping strategies. These are techniques that have been adapted from Brief Therapy change processes. Affective structuring techniques utilise strong affect for directed motivation towards surface purposes. Covert directives are techniques that deal with the problem that extensive direction is necessary in teaching yet extensive direction undermines empowerment. The subjectivist solution is to use covert directives so that the students have the subjective experience of choosing their actions. Self-cuing coping strategies empower by putting the initiation of meta-cognitive-affective processes under the conscious control of the student. For example, the student can initiate the mental set required for 'critical evaluation' or for 'on-task concentration'. The learner is empowered because the initiation of these states of awareness, that are necessary for different aspects of learning, become under the learner's conscious direction.

There is only space in this paper to briefly illustrate how three affective-structuring techniques are used to design surface-purposes. These three affect-structuring methods are:

(i) The emotional anchor - this ensures the relevance of all learning states
(ii) The motivator - this implies success, recognises ownership, and gives an entrance to the activity
(iii) The cognitive direction - this guides students in organising their tasks and guides them as to what information is relevant to the tasks.

Subjectivist teaching application with Grade 7 children

Two surface purpose activities are now described to illustrate classroom applications of subjectivism. They were designed and taught according to subjectivist principles. They both teach aspects of circles; namely, revision of parts of a circle by rote learning and, in pedagogic contrast, concepts of curvature.

First activity: to revise the names of parts of a circle

The pedagogic purpose of the first activity was to revise the names of parts of a circle - tangent, circumference, chord etc. The lesson is generic so could have taken place in almost any lower secondary mathematics class. It actually took place in a rural secondary school. There were 31 boys and girls sitting in rows of double desks to the front of the class on a concrete floor. The concrete floor was one contextual factor utilised by the male teacher. The other was his knack of drawing on the blackboard, in a instant, an almost perfect circle; which he knew from previous experience much awed the children. For this revision lesson, on the parts of the circle, he asked the children to turn to the children in the next double desk so that they could conveniently work in teams of four. He gave each team of four children a broken piece of chalk. While the children watched him, waiting to know what to do with their chalk, he 'instantly' drew, as if by magic, a near perfect circle on the blackboard, to the astonished surprise of the children. "I wonder which team can draw an exact copy of this circle on the floor at the back of the class". The children were very keen to try but he delayed them by saying, "How will we all know which circle belongs to your team. Your team needs a name to write on their circle. Choose the name of part of a circle for your team". He then gave the easiest examples "such as centre or tangent". After giving the teams a few moments to choose their name, he pointed at each group in turn to ask them what name they would write on their circle. After the third group the names started to be repeated so he pointed much slower with a puzzled look on his face. The children quickly realised that each team must have a different name to write on their circle and so some children asked the first repeaters to choose a different name. As the teacher continued pointing to successive groups you could see the children hoping their name would not be chosen first by another team, and you could see those teams whose name was chosen first quickly trying to find a part of the circle that had not been chosen by an earlier team. Towards the end, when it was more difficult because there were few choices left, other children called out 'helpful' suggestions, which the current team had to evaluate because some of the names suggested had already been chosen.

Analysis of the first teaching activity

First we analyze the execution of the pedagogic purpose, which was to rote learn the names to the limit of their ability. The teacher gave the easiest examples knowing these would be chosen first. As is appropriate for rote learning, the names were rehearsed many times; first during the teams' first selection of a name. As each team announced its name all children needed to remember what names had been chosen and to mentally compare these against the other possible choices. This was all done mentally as none of this was written down. When there was any doubt the earlier groups quickly confirmed if their name was being re-chosen. The children then had to remember their own team name throughout the next activity.

Secondly we analyze the subjectivist design and its execution.

The emotional anchor: The teacher used his knack of drawing a near perfect circle that he knew the children would like to emulate.

The motivator: Children realized that their team must have a unique name.

The cognitive direction: The teacher indicated for each group in turn to let others know the name they had chosen.

Empowerment: The teacher had the 'slowest' children in the front desks, and he asked them first, so that they would be sure to succeed. He initiated an obvious pattern of choosing the teams (down each row of double desks from the front) so that the 'next' team were 'self-chosen'. He allowed names to be called out so that at the end everyone could contribute to everyone's success. He also gave recognition to the children's abilities by allowing other teams the authority of confirming if a name was being re-chosen.

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Enculturation: The names that a team chose acted symbolically like a logo. Each team was socially bonded by the name upon which they have agreed. "We are the tangents". This was reinforced by publicly claiming ownership of the name when it was mistakenly re-chosen "That's our name!". Individual students sought and got social recognition by calling out a name that was needed by the later groups to choose.

Second activity: to appreciate the curvatures of circles

The second activity was for the teams to draw an exact copy of the blackboard circle on the concrete floor at the back of the class and to name their circle. Teams learnt surreptitiously from one another. For example, when one team member went to measure the circle on the board, members from other teams later followed suit. They also followed the lead of some teams in rubbing out parts of their circle and redrawing these parts of the circumference. Most interestingly, some teams who wrote their name anywhere on the their circle, saw that others had drawn the part of the circle corresponding to their name and had written their name on the appropriate part and copied this idea. Teams that finished first went around comparing the work of other's to their own.

When all were finished the teacher asked everyone to stand back against the walls "so we can see how well you have done". After the circles and names had been perused for a few moments he asked the students to decide which circle was the best, other than their own. After a few more moments he said "go and stand in the circle you think is the best - not your own". Students were given time to change between circles for their own reasons (social or judgmental). There was some laughter as many students tried to stand in one of the better circles. That was the end of that activity.

Analysis of the second teaching activity

We now analyse the design and execution of the pedagogic purposes which were to (i) again revise the parts of a circle (ii) appreciate the constant curvature of a circle of fixed size, and (iii) appreciate how the curvature 'flattens' as the size of the circle increases. The following observations indicate how each of these pedagogic purposes was achieved:

(i) To enhance rote learning of the names the activity encouraged rehearsal of the names in two ways. First, most teams realised that it was 'better' to write their team name on the appropriate part of their circle. Secondly, when comparing circles from the side of the classroom, students found it necessary to name the circles as well as point to the ones to which they were referring. (ii) Some students started drawing 'instant' circles as the teacher had done. These needed a lot of redrawing and repairing. In order to do this students needed to appreciate the constant curvature of their circle. Similarly, students worked within their teams to criticise irregular curvatures, agree on which parts should be rubbed out, and changed and recharged the circumferences to their own standards. (iii) Students copied the idea of taking measurements from the board to be more exact. These students had to 'flatten' or 'bend' the curvature of their circles when they realised that they had drawn them either too large or too small.

We now analyse the subjectivist design and its execution.

The emotional anchor: This continued from part one. The children wanted to emulate the teacher's fast, perfect drawing of a circle.

The motivator: Children saw how 'easily' the teacher did it and wanted to show they could be as good at it as their teacher.

The cognitive direction: The teacher indicated that the children could go and draw their circles on the concrete floor of the classroom.

Empowerment: Children were not subservient to the teacher's commands. Only one 'instruction' was given: an indication to start. Children choose their own areas in which to draw, how/what to draw, what/ when to change their drawing, the standard required and when to stop. Most importantly, the children were given the social constructivist power to define the 'right' answer. The teacher did not use his authority to decide which was the best result. The children each made their own choice. The 'correct answer' was not even ratified by the teacher's authority, but by the children's choices. In addition, all the drawing decisions were negotiated within the teams. Hence, students who made these decisions were empowered by their team's endorsement. At the close of the activity, by moving away from team action toward individual decision, and preventing self-choice by a team member, the individual was not felt to have 'lost' as the bonding within 'losing' teams was broken. On the contrary, individuals could 'win' by standing in a circle with their peers.

Enculturation: There was no teacher interference with the working of the teams. Students negotiated roles, decisions and standards within their teams as they do out of school. There was some inter-team competition in the team mode, when groups copied what they thought were good ideas from other teams (positioning the name, measuring the circle size, trying to copy the 'movement' used by the teacher). For the final judgement, it was evident from the changing and rechanging of positions, that peer pressure, leadership expectations, and other enculturation processes came into play to influence the final choice of where to stand. Finally, the activity ended with children laughing and hugging each other to help stay inside the circles they had chosen. 'Right' or 'wrong', they experienced enjoyment in the process of learning mathematics. These two activities lasted from 11:10am to 11:30am.

Subjectivist teaching application with 3rd year Education Students

The next two lesson segments were designed for the pedagogic purpose of demonstrating to third year education students the importance of social communication in subjectivist teaching by allowing them to subjectively experience its effects. The surface purposes of these activities are intended for children in the upper primary school so a detailed analysis in terms of emotional anchors, motivators and cognitive directions as was done in the above examples is not appropriate. These activities use three corresponding meta-affect-structuring methods which are appropiate for tertiary students role playing children's activities. For the these lesson segments, approximately 35 students from a class of 40 volunteered to take part in the two activities which took place in a large classroom used for their lectures. The tables, with students' notebooks, and the chairs were placed back against the walls to clear the centre of the room and the few students who had chosen to be on-lookers stood back against the wall or sat on the tables or chairs.

The perfect circle

The first surface purpose was called 'the perfect circle'. A thick rope, approximately 40 foot long was tied into a loop and put on the floor. The 35 students where asked to stand around outside of the loop and to pick up the rope in front of them. While they were holding the rope they were given large brown paper bags which they were asked to put over their heads in such a way that they could not see the floor or the rope they were holding. They were then asked to imagine that everyone holding the rope moved so that the rope formed a perfect circle. After a few moments imagining this, they were then asked to move, without looking, so that the rope did in fact form a perfect circle and when they were satisfied that the circle was perfect, they were to stand still to indicate that they were satisfied.

It was interesting to see that some students were slow to start moving and that others were already tugging the rope in their chosen directions. Some students called out to friends they remembered as standing opposite them to try and judge relative positions from the replies. Others followed their own plans such as

telling their neighbours to move backwards until the rope was taught. The on-lookers began calling instructions to chosen individuals, some of whom tried to comply while others continued to follow their own personal plans. As the activity continued students who wanted to stand still to indicate they were satisfied were tugged reluctantly to new positions by others who were not satisfied. As the energy subsided the students were told that most people were now still and that they should also stand still for a moment and visualise the perfect circle they had made. After a few moments they were allowed to remove their paper bags and compare the result of their endeavours with their expectations. There was tremendous laughter and back-slapping when they saw, not the perfect circle they imagined, but the complete mess they had made.

The students were then asked to immediately make quick notes in their notebooks about their subjective experiences during the activity which could be use later to write a full account of their experience with its implications for teaching. When the quick notes were finished students moved on to the second subjectivist activity, also intended for upper primary school children, which was called 'Send Miss centre home'

Send Miss Centre home

The rope was utilised again. Two friends were asked to be volunteers: one to be 'the chooser' and the other to be Miss or Mister Center. They stood at the side of the room while the other students, standing outside the rope with their eyes open, quickly - this time - made a perfect circle with the rope on the floor. The student who had chosen to be Miss Centre was asked to go and stand exactly at the centre of the circle marked by the rope, which was to be her 'home'. As there was no mark on the floor, there was some negotiation until students agreed to where exactly Miss Centre lived. When everyone, including Miss Centre, was satisfied that she was standing on the exact centre, the chooser was asked to place one of the brown paper bags over Miss Centre's head so that she could not see. When this was confirmed, to then take her to the edge of the circle and walk her around a little until she was completely lost away from home, and then to leave her there. It was then everyone's' responsibility to get Miss Centre home for dinner which was in 5 minutes time. To do this anyone could put up their hand and wait to be chosen to say the two words 'come' and then 'stop'. They could not repeat the words. They can only say each word once each time they were chosen. It was noted that the others needed to be quiet so that Miss Centre could hear from which direction the word 'come' was spoken. The chooser could touch any person who had a hand raised and so choose him or her to be the one to speak next.

Those who were engaged in this activity had to continually reconstruct the position of the unmarked centre, and extrapolate a line from the current position of Miss Centre through the circle's imagined centre to identify the most appropriate person on the circumference to be chosen to call "come". It was each student's social responsibility to check that they were or were not that person. Many students tried to identify the most important person and, needing to be quiet, tried to mime their selection to the chooser. The chooser, and the other's helpful indications, acted as a safety net to ensure that the most likely students would succeed in their social responsibility. The difficulty for Miss Centre in identifying the direction in which to walk from a single call of 'come' added a random element; while the corresponding responsibility to time when to call 'stop' added the counterbalancing element of mathematical skill. The activity is socially self-correcting so that every-one succeeds.

After 5 minutes, more or less, depending on the energy of the activity, it was dinner time. Miss Centre was asked to stand still, take off her bag and everyone decided if she was close enough to home to get her dinner. The 'children' usually all say yes, so the teacher gives dividable eatables, like a bag of sweets, to the chooser to give to Miss centre 'for dinner' and Miss centre thanks everyone for helping her to get home

in time for dinner. To consolidate the lesson's enculturation processes it is important for a peer (the chooser) to reward Miss Centre with a 'dinner' whose dividable form invites her to choose to share her prize with everyone in the class.

After this activity, students wanted to talk about their experiences. However, this energy was diverted by again asking students to immediately make quick notes in their notebooks about their subjective experiences during the activity, which they could later use to write a full account of their experiences with their implications for teaching. When students had finished making their notes, their need to talk was released by inviting them to share their subjective experiences of both activities, and the implications for teaching, in self-chosen groups of three or four and to record the main points so that volunteer groups could share their main points with the whole class for extra participation credit. After the group discussions, class presentations and class discussions brought out as many different and valuable implications as possible in the time available. The students enjoyed the camaraderie of illustrating these implications with their remembered shared experiences.

References

Arnone, M. P. & Small, R. V. (1995). Arousing and Sustaining Curiosity: Lessons from the ARCS Model. *Proceedings of the 1995 Annual National Convention of the Association for Educational Communications and Technology (AECT), 17, Anaheim, CA.*

Bastick, T. (1999, January). *'Subjectivism - A learning paradigm for the 21st Century.* Paper presented at the Third North American Conference on The Learning Paradigm. San Diego, CA.

Beebe, S. A. & Ivy, D. K. (1994, November). *Explaining Student Learning: An Emotion Model.* Paper presented at the Annual Meeting of the Speech Communication Association. New Orleans, LA.

Beeth, M. E. (1996, April). Teaching from a Constructivist Paradigm: A Way of Knowing and Learning or a Case of "Pedagogical Tricks?" Paper presented at the Annual Meeting of the National Association for Research in Science Teaching , St. Louis, MO.

Boekaerts, M. E. (1988). Emotion, Motivation, and Learning. *International Journal of Educational Research, 12* (3), 227-345

Bomia, L., Beluzo, L., Demeester, D., Elander, K., Johnson, M., & Sheldon, B. (1997). The *Impact of Teaching Strategies on Intrinsic Motivation.* (ERIC Document Reproduction Service No. ED 418 925)

Brigham, F. J. (1991, October). *Generating Excitement: Teacher Enthusiasm and Students with Learning Disabilities.* Paper presented at the Annual Meeting of the Council for Learning Disabilities. Minneapolis, MN.

Brooks, J. G., & Brooks, M. G. (1993). *In Search of Understanding: The Case for Constructivist Classrooms.* (No. 611-93148). Association for Supervision and Curriculum Development, 1250 North Pitt Street, Alexandria, VA.

Bruner, J. (1960). *The Process of Education.* Cambridge, MA: Harvard University Press.

Bruner, J. (1966). *Toward a Theory of Instruction.* Cambridge, MA: Harvard University Press.

Carter, C. S. & Yackel, E. (1989, March). *A Constructivist Perspective on the Relationship between Mathematical Beliefs and Emotional Acts.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.

Cooper, P. A. (1993). Paradigm Shifts in Designed Instruction: From Behaviorism to Cognitivism to Constructivism. *Educational Technology, 33*(5), 12-19

Damon, L. (1997, February). *Preparing Teachers for Tomorrow: A Constructivist Approach.* Paper presented at the Annual Meeting of the American Association of Colleges for Teacher Education, Phoenix, AZ.

Daniels, T. G. (1994). Developmental Counselling and Therapy: Integrating Constructivism and Cognitive Development in Counselling Settings. *Canadian Journal of Counselling, 28*(2), 142-53.

Drescher, G.L. (1991). *Made-Up Minds : A Constructivist Approach to Artificial Intelligence.* MA: MIT Press.

Fielding, R. (1989). Socio-Cultural Theories of Cognitive Development: Implications for Teaching Theory in the Visual Arts. *Art Education, 42*(4), 44-47.

Garrison, D.R. (1993). A cognitive constructivist view of distance education: An analysis of teaching-learning assumptions. *Distance Education - An International Journal 14*(2).

Glasersfeld, E. v. (1996, September) *The Conceptual Construction of Time.* Presented at Mind and Time, Neuchtel, 8-10.

Greenberg, L. S. (1988). Constructive Cognition: Cognitive Therapy Coming of Age. *Counseling Psychologist, 16*(2), 235-38.

Huinker, D. & Madison, S. K. (April, 1995). *The Struggles of Kay and Aaron: Mathematics Minors in a Constructivist Paradigm of Elementary Mathematics Instruction.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.

Hwang, A. (1996). Positivist and Constructivist Persuasions in Instructional Development. *Instructional Science, 24*(5), 343-56.

John, A. & Bancroft, J. (1998, April). *Students' Perceptions and Supervisors' Rating as Assessments of Interactive-Constructivist Science Teaching in Elementary School.* Paper presented at the Annual Meeting of the National Association for Research in Science Teaching, San Diego, CA.

Lebow, D. G. (1995). *Constructivist Values and Emerging Technologies: Transforming Classrooms into Learning Environments.* Proceedings of the 1995 Annual National Convention of the Association for Educational Communications and Technology (AECT), 17, Anaheim, CA.

Lin, W. (1998, April). *The Effects of Restructuring Biology Teaching by a Constructivist Teaching Approach: An Action Research.* Paper presented at the Annual Meeting of the National Association for Research in Science Teaching, San Diego, CA.

London, C. (1988). A Piagetian constructivist perspective on curriculum development. *Reading Improvement 27*, 82-95.

London, M. (1997). *Overcoming Career Barriers: A Model of Cognitive and Emotional Processes for Realistic Appraisal and Constructive Coping. Journal of Career Development, 24*(1), 25-39.

Lyddon, W. J. (1990). First- and Second-Order Change: Implications for Rationalist and Constructivist Cognitive Therapies. *Journal of Counseling and Development, 69*(2), 122-27.

Mareschal, D. & Shultz, T. R. (1996). Generative Connectionist Networks and Constructivist Cognitive Development. *Cognitive Development, 11*(4), 571-603.

Niaz, M. (1994). Pascual-Leone's Theory of Constructive Operators as an Explanatory Construct in Cognitive Development and Science Achievement. *Educational Psychology: An International Journal of Experimental Educational Psychology, 14*(1), 23-43.

Niaz, M. (1995). Cognitive Conflict as a Teaching Strategy in Solving Chemistry Problems: A Dialectic-Constructivist Perspective. *Journal of Research in Science Teaching, 32*(9), 959-70.

Oldfather, P. & Dahl, K. (1995). *Toward a Social Constructivist Reconceptualization of Intrinsic Motivation for Literacy Learning.* Perspectives in Reading Research No. 6. National Reading Research Center, College Park, MD.

Oliver, K. M. (1997). *A Case-Based Pharmacy Environment: Cognitive Flexibility + Social Constructivism.* Paper presented at ED-MEDIA/ED-TELECOM, Calgary, Alberta, Canada.

Pirie, S. E. B. & Kieren, T. E. (1994). Beyond Metaphor: Formalising in Mathematical Understanding within Constructivist Environments. *For the Learning of Mathematics, 14*(1), 39-43.

Quartz, S. R. & Sejnowski, T. J. (1996). The Neural Basis Of Cognitive Development: A Constructivist Manifesto. *Behavioral & Brain Sciences.*

Reynolds, T. H. (1995). *Addressing Gender and Cognitive Issues in the Mathematics Classroom: A Constructivist Approach.* (ERIC Document Reproduction Service ED 404 183).

Roblyer, M. D. (1996). The Constructivist/Objectivist Debate: Implications for Instructional Technology Research. *Learning and Leading with Technology, 24*(2), 12-16.

Savery, J. R. & Duffy, T. M. (1995). Problem Based Learning: An Instructional Model and Its Constructivist Framework. *Educational Technology, 35*(5), 31-38.

Sigel, I. & Cocking, R. (1977). *Cognitive Development from Childhood to Adolescence: A Constructivist Perspective.* New York: Holt, Rinehart and Winston.

Simpson, R. D. (1987). Keeping Excitement in Teaching. *Innovative Higher Education, 12*(1), 16-21.

Spiro, R. J. (1991). Knowledge Representation, Content Specification, and the Development of Skill in Situation-Specific Knowledge Assembly: Some Constructivist Issues as They Relate to Cognitive Flexibility Theory and Hypertext. *Educational Technology, 31*(9), 22-25.

Stahl, R. J. (1995, November). *Cognitive Psychology and Constructivism: Concepts, Principles, and Implications within the Social Science Disciplines and Applications for Social Studies Education.* Paper presented at the Annual Meeting of the National Council for the Social Studies, Chicago, IL.

Steffe, L. P. (1990). Inconsistencies and Cognitive Conflict: A Constructivist View. *Focus on Learning Problems in Mathematics 12* (3-4), 99-109.

Sylwester, R. (1994). How Emotions Affect Learning. *Educational Leadership, 52*(2), 60-65.

Wadsworth, B. J. (1971) *Piaget's Theory of Cognitive Development.* New York: David McKay Company, Inc.

Willis, J. E. (1995). A Recursive, Reflective Instructional Design Model Based on Constructivist-Interpretivist Theory. *Educational Technology, 35*(6), 5-23. ■